

1 Show steps in deciding the convergence behavior of the following:

(a) 
$$\sum_{n=1}^{\infty} \frac{n^2}{2^n}$$

(d) 
$$\sum_{k=0}^{\infty} \frac{2^k}{k!}$$

(g) 
$$\sum_{n=0}^{\infty} \frac{2^{2n}}{2n!}$$

(b) 
$$\sum_{n=1}^{\infty} n \left(\frac{3}{5}\right)^n$$

(e) 
$$\sum_{n=1}^{\infty} \frac{2^n}{n^3}$$

(h) 
$$\sum_{k=1}^{\infty} \frac{k^k}{k!}$$

(c) 
$$\sum_{k=0}^{\infty} \frac{k!}{10^k}$$

(f) 
$$\sum_{n=1}^{\infty} \frac{n^5}{1.01^n}$$

(i) 
$$\sum_{k=2}^{\infty} \frac{1}{\ln(k)^k}$$

2 Announce an  $N$ -recipe for the limit of

$$a_n = \frac{3n^2 + (-1)^n n}{4n^2 - 3n},$$

then write a formal proof that your  $N$ -recipe works. Do not show your “dry labbing” this time. In your formal proof, be sure your “rising chain” is clear. Also, be explicit about any absolute-value removals. Some helps for this:

- (i) something is positive from some point on
- (ii) the triangle inequality
- (iii) the absolute value of a product.